CLAIMS

What we claim is:

SUB C1

1. A vector, comprising:

a first DNA sequence which is complementary to at least part of an alphavirus RNA genome and having the complement of complete alphavirus RNA genome replication regions to permit *in vivo* replication; and

a second DNA sequence encoding a paramyxovirus protein or a protein fragment that generates antibodies that specifically react with the paramyxovirus protein, the second DNA sequence being inserted into a region of the first DNA sequence which is non-essential for replication, the first and second DNA sequences being under transcriptional control of a promoter.

2. The vector of claim 1 wherein the paramyxovirus protein is selected from the group consisting of a parainfluenza virus (PIV) and a respiratory syncytial virus (RSV).

3. The vector of claim 2 wherein the PIV protein is seletected from the group consisting of PIV-1, PIV-2, PIV-3 and PIV-4

4. The vector of claim 3 wherein said PIV protein is selected from the group consisting of the HN and F glycoproteins of PIV-3.

5. The vector of claim 4 wherein the RSV protein is selected from the group consisting of the F or G glycoprotein of RSV.

6. The vector of claim 1 wherein the second DNA sequence encodes a full length RSV F or RSV G proteins.

7. The vector of claim 1, wherein the second nucleotide sequence encodes a truncated RSV F or RSV G protein lacking the transmembrane anchor and cytoplasmic tail.

8. The vector of claim 1 wherein the alphavirus is a Semliki Forest virus.

9. The vector of claim 1 wherein the first DNA sequence is the Semliki Forest viral sequence contained in plasmid pSFVI.

10. The vector of claim 1 wherein the promoter sequence is an immediate early cytomegalovirus (CMV) promoter.

11. The vector of claim 1 further comprising a third DNA sequence located adjacent the second DNA sequence to enhance the immunoprotective ability of the paramyxovirus protein when expressed *in vivo* from the vector in a host.

12. The vector of claim 11 wherein the third nucleotide sequence comprises a pair of splice sites to prevent aberrant mRNA splicing, *in vivo* whereby substantially all transcribed mRNA from the vector region administration encodes the RSV protein.

13. The vector of claim 12 wherein the third nucleotide sequence is located between the first nucleotide sequence and the promoter sequence.

14. The vector of claim 13 wherein said third nucleotide sequence is that of rabbit β-globin intron II.

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15. The vector of claim 10 wherein said promoter sequence is an immediate early cytomegalovirus (CMV) promoter and the human cytomegalovirus Intron A sequence is provided downstream of the promoter and upstream of the third nucleotide sequence.

16. The vector of claim 15 further comprising a fourth nucleotide sequence at the 3'-end of the first nucleotide sequence to to ensure proper *in vivo* cleavage at the 3'-end of the first nucleotide sequence.

17. The vector of claim 16 wherein said fourth nucleotide sequence is a hepatitis delta virus ribozyme sequence.

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18. The vector of claim 1 which has the identifying characteristics of plasmid pMP44 shown in Figure ~~2D~~ 2B.

19. The vector of claim 1 which has SEQ ID No: 1.

~~20.~~ A method of immunizing a host against disease caused by infection with paramyxovirus, which comprises administering to the host an effective amount of a vector as claimed in claim 1.

21. The method of claim 21 wherein said vector has the identifying characteristics of plasmid pMP44 shown in Figure ~~2D~~ 2B.

B

22. The method of claim 21 wherein said vector has SEQ ID no: 1.

~~23~~. A method of using a gene encoding an RSV F or G protein or a fragment of an RSV or G protein capable of

generating antibodies which specifically react with RSV F or G protein to protect a host against disease caused by infection with respiratory syncytial virus, which comprises:

isolating said gene;

operatively linking said gene to a DNA sequence which is complementary to at least part of an alphavirus RNA genome and having the complement of complete alphavirus RNA genome replication regions in a region of said DNA sequence which is non-essential for replication to form a vector wherein said gene and DNA sequence are under transcriptional control of a promoter; and

introducing the vector into the host.

24. The method of claim 23 wherein said gene encoding an RSV F protein encodes an RSV F protein lacking the transmembrane region.

25. The method of claim 24 wherein said promoter comprises the immediate early cytomegalovirus promoter.

26. The method of claim 25 including the step of:

operatively linking said gene to an immunoprotective enhancing sequence to produce an enhanced immunoprotection to said RSV F protein in said host.

27. The method of claim 26 wherein said immunoprotective enhancing sequence is introduced into said vector between said control sequence and said gene.

28. The method of claim 27 wherein said immunoprotection enhancing sequence comprises a pair of splice sites to prevent aberrant mRNA splicing whereby

substantially intact transcribed mRNA encodes an RSV F protein.

29. The method of claim 28 wherein said immunoprotection enhancing sequence is that of rabbit ß-globin intron II.

30. The method of claim 23 wherein said vector is plasmid pMP44.

31. The vector of claim 23 wherein said vector has SEQ ID no: 1.

32. A method of producing a vaccine for protection of a host against disease caused by infection with respiratory syncytial virus (RSV), which comprises:

isolating a first DNA sequence encoding an RSV or G protein, from which the transmembrane anchor and cytoplasmic tail may be absent;

operatively linking said first DNA sequence to a second DNA sequence which is complementary to at least part of an alphavirus RNA genome and having the complete alphavirus genome replication regions in a region of said second DNA sequence which is non-essential for replication to form a vector wherein said first and second DNA sequences are under transcriptional control of a promoter; and

formulating the vector as a vaccine for *in vivo* administration.

33. The composition of claim 32 wherein said vector has the identifying characteristics of pMP44 shown in Figure 2B ~~2D~~.

34. The method of claim 32 wherein said vector has SEQ ID no: 1.

35. A vaccine for administration to a host, including a human host, produced by the method of claim 32.

36. An immunogenic composition comprising an immunoeffective amount of a vector of claim 1.

37. The composition of claim 36 wherein said vector has the identifying characteristic of pMP44 in Figure 2B.

38. The composition of claim 36 wherein said vector has SEQ ID no: 1.